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The sympatry of night herons in Borneo

by Frederick H. Sheldon and Manuel Marin A.

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Although suspected for almost a century, breeding of the Rufous Night Heron *Nycticorax caledonicus* in Borneo was not confirmed until the mid-1970s, when J. Q. Phillipps discovered a breeding colony at Likas in Sabah, East Malaysia (Smythies 1981). Th status of this night heron on the island is of interest because the Rufous Night Heron and the Black-crowned Night Heron *N. nycticorax,* a well-known resident of Borneo, are thought to constitute a superspecies based on a virtually allopatric distribution (Bock 1956).

N. caledonicus and *N. nycticorax* in fact come into contact on some islands in SE Asia and Wallacea in addition to Borneo, and the extent and significance of their range overlap has been debated. In general, the Philippines, Sulawesi, and the Lesser Sundas form the western extreme of the range of *N. caledonicus;* and Java and Borneo form the eastern extreme for *N. nycticorax.* White (1973) argued that the 2 species are virtually allopatric. He considered that the distributional data are confounded because of wintering migrant *N. nycticorax* (especially in the Philippines), vagrant *N. caledonicus* in north Borneo, and vague, 19th century sympatric breeding records from Sulawesi. Hoogerwerf (1936, 1966) studied a situation in Java similar to that in Borneo, namely one in which *N. caledonicus* apparently had come recently in contact with a large established population of *N. nycticorax.* He found (1936) that the few nests of *N. caledonicus* occurring in Javan heronries were intermingled with those of *N. nycticorax,* rather than clumped in a separate sub-colony. Hoogerwerf thought the 2 species mated selectively in east Java, but he suspected mixed mating in west Java based on his own observations of nests and on the identification of one hybrid individual in a zoo and 4 in the field (1966). Hubbard (1976), reporting on specimens and field notes from a 1973 Luzon collection, found evidence of summering *N. nycticorax* in the otherwise *N. caledonicus*-dominated Philippines. He also described a possible *nycticorax-caledonicus* hybrid among the specimens.

In 1983, as members of the Western Foundation of Vertebrate Zoology expedition to Sabah, we visited the Borneo site where the 2 night heron species were breeding (it is also used for roosting) to study the interaction between these 2 species, particularly whether they hybridize or mate selectively, with a view to providing clues to their derivation and radiation. We paid 6 visits to Likas Swamp near Kota Kinabalu, Sabah (5°59′N, 116°06′E), 18 May–15 June 1983. Likas is a stagnant, sewage-filled mangrove swamp covering one km² and is cut off from the sea by rapidly encroaching suburban development.

Its proximity to Kota Kinabalu, Borneo's most developed city, makes it a convenient bird watching site, but also exposes it to constant predation by shooters and egg gatherers.

All the common heron species of Sabah's west coast, with the exception of the Reef Egret *Egretta sacra,* roost at Likas. In addition to the night herons, Great Egrets *Egretta alba,* Little Egrets *E. garzetta,* Plumed Egrets *E. intermedia* and Little Herons *Butorides striatus* nest there.

N. nycticorax outnumbered *N. caledonicus* by at least 10: 1 at Likas. We found 25 nests and observed about 200 individuals of *nycticorax* and 3 nests and 20 individuals of *caledonicus.* On 20 May 1983, the *caledonicus* nests contained respectively 2 eggs, one egg with one chick, and 2 chicks. Unlike those seen by Hoogerwerf (1936), the *caledonicus* nests were not intermingled with those of *nycticorax,* but were grouped together on the fringe of the swamp, while the *nycticorax* nests were roughly aggregated at the centre of the swamp. In addition, we had the impression that neither species flew together with the other, except when flushed. We saw no hybrids or mixed pairs.

We located a separate night heron roosting site in the mangroves along the Darau River near Menggatal (6°01′N, 116°08′E). Hundreds of night herons fly from this site each evening, including small numbers of *N. caledonicus. N. nycticorax* is known to nest in this locality, but we did not ascertain if *N. caledonicus* does.

Discussion. Hancock & Elliott (1978) suggest that *N. caledonicus* reached its present distribution in Wallacea as the result of a range expansion from Australia. Indeed, the Wallacean *N. caledonicus* is the Australian race, *hilli,* and a westward range expansion seems to have occurred in the Lesser Sunda islands, where *N. caledonicus* is rare, leading to the colonization of Java in about 1933 (Hoogerwerf 1966). The hybridization between *N. caledonicus* and *N. nycticorax* reported by Hoogerwerf tends to confirm recent contact between these species in Java.

However, the Philippine *N. caledonicus* clearly has not come recently to that region. It is the predominant night heron species in the Philippines, and it has been separated from *hilli* long enough to have differentiated into at least one race, *manillensis,* and possibly another, *major* (Hubbard 1976). The hybrids reported in the Philippines by Hubbard (1976) appear to be the result of range extension by *N. nycticorax* from mainland Asia. Prior to Hubbard's report, breeding of *N. nycticorax* in the Philippines was unknown (duPont 1971, White 1973).

In Borneo, the *N. caledonicus* race is *manillensis* (Hubbard 1976, Smythies 1981). Before breeding was confirmed for Borneo, it was assumed that the specimens collected there were vagrants from the Philippines via the Sulu archipelago or Palawan (White 1973, Smythies 1981). Now it seems more likely that these specimens, which include immature birds collected in the last century, are of birds which bred in Borneo. Our preliminary evidence of selective mating seems to indicate that the breeding of *N. caledonicus* side-by-side with *N. nycticorax* is not a new phenomenon.

In considering the dynamics of the contact zone between *N. nycticorax* and *N. caledonicus,* it should be remembered that these species are closely related, as shown morphologically by Bock (1956) and Payne & Risley (1976) and genetically by Hoogerwerf (1966) and Hubbard (1976). They are not separated by "Wallace's Line" and, thus, have not come together riding on

different tectonic plates. The separation and isolation event leading to their slight differentiation must have occurred relatively recently, possibly as the result of the colonization of the Philippines from mainland Asia; in which case they have probably abutted in north Borneo long enough to have developed selective mating. On the other hand, hybridization would be expected in Java, where expansion of the range of *N. caledonicus* has brought it into contact with *N. nycticorax* in this century, and also on the main islands of the Philippines, where migrant or vagrant *N. nycticorax* from Asia apparently have begun to breed within the last 20 years.

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The affect of alcohol immersion on the plumage colours of bee-eaters

by C. H. Fry

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A specimen of *Merops persicus* in the Museu Civico, Milan, collected in Eritrea in 1906, is blue or blue-green where typical specimens are grass-green, and its forehead and cheeks are white without any traces of yellow. The bird was described initially by E. Moltoni as a new subspecies, *M. p. erythraeus* (Moltoni 1928), but later he treated it as a colour mutant of *M. p. persicus* (Moltoni & Gnecchi Ruscone 1940-1944). The British Museum (Natural History), Tring, has a specimen of identical appearance, taken in Kashmir in 1918 and marked "sent in spirit to Mr Gordon". I thought it likely that both specimens owe their yellowless plumage to prolonged alcohol immersion (Fry 1984). As a test, I immersed specimens (from my collection) of *M.*